



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Minsheng Wang

Appl. No.: to be assigned

Filed: February 25, 2004

For: **State-Delayed Technique and
System to Remove Tones of
Dynamic Element Matching**

Confirmation No.: to be assigned

Art Unit: 2819

Examiner: Peguy Jean Pierre

Atty. Docket: 1875.3760001

Information Disclosure Statement

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Listed on accompanying Form PTO-1449 are documents that may be considered material to the examination of this application, in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.56, 1.97 and 1.98.

Where the publication date of a listed document does not provide a month of publication, the year of publication of the listed document is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the month of publication is not in issue. Applicant has listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may

not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

Applicant has checked the appropriate boxes below.

- ☐ 1. Statement under 37 C.F.R. 1.704(d). Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.
- ☒ 2. Filing under 37 C.F.R. § 1.97(b). This Information Disclosure Statement is being filed within three months of the date of filing of a national application other than a continued prosecution application (CPA), OR within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application, OR before the mailing date of a first Office Action on the merits OR before the mailing of a first Office Action after the filing of a request for continued examination under 37 C.F.R. § 1.114. No statement or fee is required.
- ☐ 3. Filing under 37 C.F.R. § 1.97(c). This Information Disclosure Statement is being filed more than three months after the U.S. filing date AND after the mailing date

of the first Office Action on the merits, but before the mailing date of a Final Rejection, or Notice of Allowance, or an action that otherwise closes prosecution in the application.

☐ a. Statement under 37 C.F.R. § 1.97(e)(1). I hereby state that each item of information contained in this Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. § 1.97(e)(1).

☐ b. Statement under 37 C.F.R. § 1.97(e)(2). I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. § 1.97(e)(2).

☐ c. Attached is our PTO-2038 Credit Card Payment Form in the amount of \$_____ in payment of the fee under 37 C.F.R. § 1.17(p).

☐ 4. Filing under 37 C.F.R. § 1.97(d) This Information Disclosure Statement is being filed more than three months after the U.S. filing date and after the mailing date of a Final Rejection or Notice of Allowance, but before payment of the Issue Fee. Enclosed find our PTO-2038 Credit Card Payment Form in the amount of \$_____ in payment of the fee under 37 C.F.R. § 1.17(p); in addition:

- ☐ a. Statement under 37 C.F.R. § 1.97(e)(1). I hereby state that each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. § 1.97(e)(1).
- ☐ b. Statement under 37 C.F.R. § 1.97(e)(2). I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. § 1.97(e)(2).
- ☐ 5. The document(s) was/were cited in a search report by a foreign patent office in a counterpart foreign application. Submission of an English language version of the search report that indicates the degree of relevance found by the foreign office is provided in satisfaction of the requirement for a concise explanation of relevance. 1138 OG 37, 38.
- ☐ 6. A concise explanation of the relevance of the non-English language document(s) appears below:
- ☐ 7. Copies of the documents are submitted herewith.

- ☒ 8. Copies of the documents were cited by or submitted to the Office in an IDS that complies with 37 C.F.R. § 1.98(a)-(c) in Application No. 10/434,220, filed May 9, 2003, which is relied upon for an earlier filing date under 35 U.S.C. § 120. Thus, copies of these documents are not attached. 37 C.F.R. § 1.98(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449, and indicate in the official file wrapper of this patent application that the documents have been considered.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Michelle K. Holoubek
Patent Agent for Applicant
Registration No. 54,179

Date: February 25, 2004

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Washington, D.C. 20005-3934
(202) 371-2600

FORM PTO-1449

INFORMATION DISCLOSURE STATEMENTATTY. DOCKET NO.
1875.3760001APPLICATION NO.
To be assignedFIRST NAMED INVENTOR
Minsheng WangFILING DATE
February 25, 2004ART UNIT
2819**U.S. PATENT DOCUMENTS**

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB-CLASS | FILING DATE |
|---------------------|-----|--------------------|---------|--------------------------|-------|-----------|-------------|
| | AA1 | 6,583,742 | 06-2003 | Hossack, David MacDonald | | | |
| | AB1 | 6,292,124 | 09-2001 | Hanada et al. | | | |
| | AC1 | 6,124,813 | 09-2000 | Robertson et al. | | | |
| | AD1 | 6,518,899 | 02-2003 | Yu, Xianggang | | | |
| | AE1 | 6,577,261 | 06-2003 | Brooks et al. | | | |
| | AF1 | 6,545,623 | 04-2003 | Yu, Paul C. | | | |
| | AG1 | 6,466,153 | 10-2002 | Yu, Paul C. | | | |
| | AH1 | | | | | | |
| | AI1 | | | | | | |
| | AJ1 | | | | | | |
| | AK1 | | | | | | |

FOREIGN PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB-CLASS | TRANSLATION |
|---------------------|-----|--------------------|------|---------|-------|-----------|-------------|
| | AL1 | | | | | | Yes No |
| | AM1 | | | | | | Yes No |
| | AN1 | | | | | | Yes No |
| | AO1 | | | | | | Yes No |
| | AP1 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
|--|----|---|---|
| | AR | 1 | Kwan, "Shuffler Apparatus and Related Dynamic Element Matching Technique for Linearization of Unit-Element Digital to Analog Converters, Fig. 2a, US 2003/0137439 |
| | AS | 1 | Yasuda <i>et al.</i> , "A Third-Order Δ - Σ Modulator Using Second-Order Noise-Shaping Dynamic Element Matching," IEEE Journal of Solid-State Circuits, Vol. 33, No. 12, pp. 1879-1886, IEEE (December 1998). |
| | AT | 1 | Kwan <i>et al.</i> , "A Stereo Multibit $\Sigma\Delta$ DAC with Asynchronous Master-Clock Interface," IEEE Journal of Solid-State Circuits, Vol. 31, No. 12, pp. 1881-1887, IEEE (December 1996). |

EXAMINER

DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

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|------------------|-----|-----------------|------|------|-------|-----------|-------------|
| | AA2 | | | | | | |
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| | AL2 | | | | | | Yes No |
| | AM2 | | | | | | Yes No |
| | AN2 | | | | | | Yes No |
| | AO2 | | | | | | Yes No |
| | AP2 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
|--|----|---|--|
| | AR | 2 | Adams <i>et al.</i> , "A 113-dB SNR Oversampling DAC with Segmented Noise-Shaped Scrambling," IEEE Journal of Solid-State Circuits, Vol. 33, No. 12, pp. 1871-1878, IEEE (December 1998). |
| | AS | 2 | Welz <i>et al.</i> , "Simplified Logic for First-Order and Second-Order Mismatch-Shaping Digital-to-Analog Converters," IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 48, No. 11, pp. 1014-1027, IEEE, (November 2001). |
| | AT | 2 | Grilo <i>et al.</i> , "A 12-mW ADC Delta-Sigma Modulator With 80 dB of Dynamic Range Integrated in a Single-Chip Bluetooth Transceiver," IEEE Journal of Solid -State Circuits, Vol. 37, No. 3, pp. 271-278, IEEE (March 2002) |

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| | AA3 | | | | | | |
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|---------------------|-----|--------------------|------|---------|-------|-----------|-------------|
| | AL2 | | | | | | Yes No |
| | AM2 | | | | | | Yes No |
| | AN2 | | | | | | Yes No |
| | AO2 | | | | | | Yes No |
| | AP2 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | |
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| AR | <u>3</u> | Ian Galton, "Spectral Shaping of Circuit Errors in Digital-to-Analog Converters," IEEE Transactions on Circuits and Systems - II: Analog and Digital Signal Processing Vol. 44, No. 10 pp. 808-817, IEEE (October 1997). |
| AS | <u>3</u> | Norsworthy <i>et al.</i> , Delta-Sigma Data Converters: Theory, Design and Simulation, pp. 185-186, IEEE Press. |
| AT | <u>3</u> | Zelniker <i>et al.</i> , Advanced Digital Signal Processing: Theory and Applications, pp. 357-364, Marcel Dekker, Inc. (1994). |

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| | AL1 | | | | | | Yes No |
| | AM1 | | | | | | Yes No |
| | AN1 | | | | | | Yes No |
| | AO1 | | | | | | Yes No |
| | AP1 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
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| | AR | <u>4</u> | Morteza Vadipour, "Techniques for Preventing Tonal Behavior of Data Weighted Averaging Algorithm in Σ - Δ Modulators," IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 47, No. 11, pp. 1137-1144, IEEE (November 2000). |
| | AS | <u>4</u> | Chen <i>et al.</i> , "Some Observations on Tone Behavior in Data Weighted Averaging," Proceedings of the 1998 International Symposium on Circuits and Systems, Vol. 1, pp. 500-503, IEEE (1998). |
| | AT | <u>4</u> | Chen <i>et al.</i> , "An Improved Technique for Reducing Baseband Tones in Sigma-Delta Modulators Employing Data Weighted Averaging Algorithm Without Adding Dither," IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 46., No. 1, pp. 63-68, IEEE (January 1999). |

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| | AL2 | | | | | | Yes No |
| | AM2 | | | | | | Yes No |
| | AN2 | | | | | | Yes No |
| | AO2 | | | | | | Yes No |
| | AP2 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
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| | AR | <u>5</u> | Radke <i>et al.</i> , "A 14-Bit Current-Mode $\Sigma\Delta$ DAC Based Upon Rotated Data Weighted Averaging," IEEE Journal of Solid-State Circuits, Vol. 35, No. 8, pp. 1074-1084, IEEE (August 2000). |
| | AS | <u>5</u> | Baird <i>et al.</i> , "Improved $\Delta\Sigma$ DAC Linearity Using Data Weighted Averaging", pp. 13-16, IEEE (1995). |
| | AT | <u>5</u> | Radke <i>et al.</i> , "A Spurious-Free Delta-Sigma DAC Using Rotated Data Weighted Averaging," IEEE 1999 Custom Integrated Circuits Conference, pp. 125-128, IEEE (1999). |

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| | AH3 | | | | | | |
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|---------------------|-----|--------------------|------|---------|-------|-----------|-------------|
| | AL2 | | | | | | Yes No |
| | AM2 | | | | | | Yes No |
| | AN2 | | | | | | Yes No |
| | AO2 | | | | | | Yes No |
| | AP2 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
|--|----|----------|---|
| | AR | <u>6</u> | Jensen et al., "A Low-Complexity Dynamic Element Matching DAC for Direct Digital Synthesis," IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 45, No. 1, pp. 13-27, IEEE (January 1998) |
| | AS | <u>6</u> | Annovazzi et al., "A Low-Power 98-dB Multibit Audio DAC in a Standard 3.3-V 0.35- μ m CMOS Technology," IEEE Journal of Solid-State Circuits, Vol. 37, No. 7, pp. 825-834, IEEE (July 2002) |
| | AT | <u>6</u> | Welz et al., "A Necessary and Sufficient Condition for Mismatch Shaping in Multi-Bit DACs," IEEE, pp. I-105 to I-108, IEEE (2002) |

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|---------------------|-----|--------------------|------|------|-------|-----------|-------------|
| | AA7 | | | | | | |
| | AB7 | | | | | | |
| | AC7 | | | | | | |
| | AD7 | | | | | | |
| | AE7 | | | | | | |
| | AF7 | | | | | | |
| | AG7 | | | | | | |
| | AH7 | | | | | | |
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| | AK7 | | | | | | |

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| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB-CLASS | TRANSLATION |
|---------------------|-----|--------------------|------|---------|-------|-----------|-------------|
| | AL7 | | | | | | Yes No |
| | AM7 | | | | | | Yes No |
| | AN7 | | | | | | Yes No |
| | AO7 | | | | | | Yes No |
| | AP7 | | | | | | Yes No |

OTHER (Including Author, Title, Date, Pertinent Pages, etc.)

| | | | |
|--|----|----------|--|
| | AR | <u>1</u> | Fogleman et al., "A Digital Common-Mode Rejection Technique for Differential Analog-to-Digital Conversion," IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 48, No. 3, pp. 255-271, IEEE (March 2002) |
| | AS | <u>1</u> | Lin et al., "A Bandpass Mismatch-Shaped Multi-Bit $\Sigma\Delta$ Switched-Capacitor DAC using Butterfly Shuffler," 1999 IEEE International Solid-State Circuits Conference, 0-7803-5129-0/99, IEEE (1999) |
| | AT | <u>1</u> | |

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